

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: KIM, Sangyum; CHOI, Chang Hee; JO, Cha Jae; KIM, Jeong Ik; WOO, Kyung Nyung; KI, Joon Seo; MOON, Hong Gi

SERIAL NO.: 10/720,579 ART UNIT: 1753

FILED: November 24, 2003 EXAMINER: Wong, E.

TITLE: METHOD FOR MANUFACTURING VERY LOW ROUGHNESS  
ELECTRODEPOSITED COPPER FOIL AND ELECTRODEPOSITED COPPER FOIL  
MANUFACTURED THEREBY

Amendment C: CLAIM AMENDMENTS

Claims 1 - 31 (canceled).

32. (new) A method for manufacturing an electrodeposited copper foil comprising:

forming an electrolyte solution containing a sulfuric acid and a copper ion and a chloride ion;

adding an additive to said electrolyte solution, said additive consisting of 0.1ppm to 100ppm of gelatin and 0.05ppm to 50ppm of hydroxyethyl cellulose and 0.05ppm to 20ppm of bis(sodiumsulfopropyl)disulfide, said gelatin having a molecular weight of greater than 10000;

submerging a rotating drum and an anode plate in said electrolyte solution, said anode plate having a curved shape and spaced by a distance from an outer surface of said drum; and

applying a negative current to said drum and a positive current to said anode plate so to deposit the copper foil onto said outer surface of said drum.

33. (new) The method of Claim 32, said gelatin being an amount of between 2ppm to 5ppm.

34. (new) The method of Claim 32, said hydroxyethyl cellulose being an amount of between 1ppm to 3ppm.

35. (new) The method of Claim 32, said bis(sodiumsulfopropyl)disulfide being an amount of between 0.5ppm to 3ppm.

36. (new) The method of Claim 32, wherein the deposited copper foil has a matte side and a shiny side, said matte side having a roughness greater than a roughness of said shiny side.

37. (new) The method of Claim 32, said sulfuric acid being an amount of 50 to 200 g/l, said copper ion being in an amount of 30 to 150 g/l, said chloride ion being in an amount of 200mg/l.

38. (new) The method of Claim 32, said electrolyte solution being at a temperature of between 20 and 80°C.

39. (new) The method of Claim 32, said electrolyte having a negative current density of between 20 and 150A/dm<sup>2</sup>.